

**TECHNICAL REVIEW AND EVALUATION OF APPLICATION FOR
AIR QUALITY PERMIT NO. 1000149**

I. INTRODUCTION

The Fairview Generating Station, located one mile north of Highway 80 on Sulphur Springs Road in Douglas, Arizona, is solely owned and operated by Arizona Public Service Company (APS). The station provides power to the electric grid on an as-needed-basis, primarily during emergency situations such as interruption of the main power lines.

A. Company Information

Unit	Hours	Mw/Hr	Mw-Hr/Year
Total			183,522

The combustion turbine at Fairview is designed to fire fuel oil and natural gas. The current standard operating scenario for the source, however, is to burn only fuel oil at a capacity factor of 0-100%. No alternative operating scenario is proposed in the application, and natural gas has been added as a fuel that may be burned. Table 2 summarizes the standard operating scenario at Fairview. Data from the emission calculations in Section 20 of the application show that Fairview has a PTE greater than 100 tons per year for sulfur dioxide, nitrogen oxides and carbon monoxide.

Table 2: Fairview Generating Station Operating Scenarios

Source	Normal Operating Scenario	Alternate Operating Scenarios	Capacity Factor	Operational Flexibility
Combustion Turbine	#2 Fuel Oil	None	0 - 100%	0 - 100% of Fuel Available

III. EMISSIONS

The Fairview station burns fuel oil and natural gas as outlined in Section II of this Technical Remarks document. Table 3 lists typical operating parameters for the turbine and is used when calculating the emissions. Table 4 summarizes the potential to emit (PTE), allowable emissions and the emissions inventory (EI) data for this unit. The emission factors used to calculate the potential to emit are from AP-42 (1/95 ed.). APS, in its application, provided the emission factors for the fuel oil combustion turbine from *EPA's AIRS Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants, March, 1990*. These numbers do not vary significantly from AP-42 numbers. The allowable emissions are calculated using the standards under A.A.C. R18-2-719. The reader is advised to peruse the permit application for HAPs emissions calculations. Due to the small size of the startup engine, please refer to the application for emissions profile and operating parameters.

AP-42 emissions factors from 1/95 are more recent and more accurate than the emission factors used by APS. The resulting increases (and decreases in some cases) in potential to emit from using the AP-42 factors do not change the source category status, and do not trigger any new applicable requirements, except that of carbon monoxide while burning diesel where potential to emit is 62.21 tons per year by AP-42 factor and 149.70 tons per year by APS factor. The formula used to calculate PTE from the unit burning fuel oil is the following:

$$\text{Emissions (tpy)} = \text{Emission Factor (lb/gal)} \times \text{Net Heat Rate (Btu/KWh)} \times \text{Max. Generating Capacity (KW)} / \text{Heating Value of Fuel (Btu/1000 gal)} / 10^3 \text{ (gal/1000 gal)}$$

x 8760 (hr/yr)/2000 (lbs/ton)

The formula used to calculate PTE from the unit burning natural gas is the following:

$$\text{Emissions (tpy)} = \frac{\text{Emission Factor (lb/MMBtu)} \times \text{Net Heat Rate (Btu/KWh)} \times \text{Max. Generating Capacity (KW)} \times 8760 \text{ (hr/yr)}}{(2000 \text{ (lbs/ton)} \times 10^6 \text{ (Btu/MMBtu)})}$$

Table 3: Typical Operating Parameters

Description	Combustion turbine (G.E. Frame 5)
Average generating capacity (KW)	16,500
Maximum generating capacity (KW)	20,950
Net heat rate at average capacity (Btu/KW.hr)	15,100
Net heat rate at maximum capacity (Btu/KW.hr)	14,125
Sulfur content of fuel oil (%)	0.50
Heating value of fuel oil (Btu/gal)	133,333
Heating value of natural gas (Btu/scf)	1,050
Specific gravity, API (diesel)	33.50
Density of fuel oil (#/gal)	7.15
Average full load fuel oil flow (#/hr)	13,369
Maximum full load fuel oil flow (#/hr)	15,878

Table 4: Comparison among PTE, allowable emissions, test data and emission inventory

Pollutant	PM10	SO ₂	NO _x	CO	VOC
Potential to emit (TPY) - Fuel Oil	79.13*	654.54	904.69	62.21	22.03
Potential to emit (TPY) - Nat. Gas	54.30	0.78	570.30	142.60	31.10
Allowable emissions by rule (TPY)	355.15	1296.10	N/A	N/A	N/A
Test data (TPY)	N/A	N/A	N/A	N/A	N/A
EI (TPY with 30 hours per year)	0.14	1.89	2.61	0.18	0.06

*This is based on AP-42 Appendix B.1-14 which shows that PM-10 is 97% of the particulate matter from an oil burning furnace.

The source has requested the use of natural gas at their facility. This recent request arises from

the close proximity a new natural gas pipeline will come to APS Fairview. The turbine at the plant is capable of being dual-fired, so no modification to the turbine design is necessary. However, new pipes and fittings must be put in place before the turbine can run on natural gas - the connection from the turbine to the pipeline must be established before the turbine can burn natural gas. The cost of these additional components is expected to be well below the 50% of fixed capital costs to build a new facility as stated in 40 CFR 60.15(b)(1). Additionally, there is also no increase in emissions of any regulated air pollutant for which a standard applies as stated in 60.14(a). There is an increase in carbon monoxide emissions, however this facility has no emission limits for carbon monoxide. Hence, the addition of natural gas is neither a modification or reconstruction.

IV. COMPLIANCE HISTORY

A. Inspections

Inspections were conducted on the turbine unit to ensure compliance with the permit conditions. Table 5 summarizes some of the recent inspections and their results.

Table 5: Inspection Results

Inspection Date	Type of Inspection	Results
December 23, 1993	Level 2 (FAR No. SRO:3138)	Opacity of the combustion turbine was read to be less than 5% 12 minutes after start-up. In compliance with 40% standard of R18-2-719.E.
September 18, 1996	Level 2 (FAR No. 16102)	Average opacity reading of the combustion turbine was in the 0-5% range immediately following the first 10 minutes of the start cycle. In compliance with 40% standard.
January 12, 1998	Level 1 (FAR No. 18933)	The unit was not in operation and no opacity reading was taken.
January 29, 1998	Level 2 (FAR No. 18937)	Average opacity reading of the combustion turbine was in the 0-5% range immediately following the first 3 minutes of the start cycle. In compliance with 40% standard.

B. Excess Emissions

No cases of excess emissions have been documented from the Fairview Generating Station.

C. Testing

This section also addresses Technical Remarks Questions C.1, C.2, and C.3.

This unit has never been tested.

D. Compliance Certifications

Previous permits for the source did not require submission of compliance certifications.

V. APPLICABLE REGULATIONS VERIFICATION

The Permittee has identified the applicable regulations in its permit application that apply to the unit. Table 6 summarizes the findings of the Department with respect to applicability or non-applicability of these regulations. Installation Permits and other previous permit conditions are discussed under Section VI of this technical review document.

Table 6: Applicable Regulations Verification

Unit ID	Start-up date	Control Equipment	Applicable Regulations	Verification
Combustion Turbine (S/N 214472) and Startup Diesel Engine	5/31/72	None	A.A.C. R18-2-719.B A.A.C. R18-2-719.C.1 A.A.C. R18-2-719.E A.A.C. R18-2-719.F A.A.C. R18-2-719.H A.A.C. R18-2-719.I A.A.C. R18-2-719.J A.A.C. R18-2-719.K	The operational start-up date of this unit is prior to October 3, 1977 and has never been modified or reconstructed, hence it is not subject to 40 CFR 60, Subpart GG. R18-2-719 imposes an opacity standard of 40%, sulfur dioxide emission standard of 1.0 lb/MMBtu heat input, and particulate matter emission standard of $1.02Q^{0.769}$ lb/hr. The 0.9% by weight sulfur content standard is through the definition of low sulfur fuel (R18-2-701.16).

VI. PREVIOUS PERMITS AND CONDITIONS

A. Previous Permits

Date Permit Issued	Permit No.	Application Basis
July 21, 1992	0380-95	Renewal of Permit No. 24126-89

B. Previous Permit Conditions

Operating Permit No. 0380-95

Some of the relevant conditions of this permit are as follows:

Table 7: Previous Permit Conditions

Operating Permit No. 0380-95	Title V Permit No. 1000149
1. Operate equipment in compliance with all the applicable conditions of A.A.C. R18-2-519.	Attachment "B"
2. Emission limit on particulate matter emissions from the combustion turbine based on heat input.	Attachment "B", I.A.1
3. Emission limit on sulfur dioxide emissions of 1.0 lb/MMBtu from the combustion turbine.	Attachment "B", I.A.2.b
4. Opacity limit of 40% on gaseous emissions from the combustion turbine.	Attachment "B", I.A.3
5. Permittee shall use only distillate oil no. 2 in the combustion turbine.	Attachment "B", I.A.4.a, includes addition of natural gas.
6. Permittee shall conduct performance test for nitrogen oxides if the hours of operation exceed 720 hours/year.	Attachment "B", III, a performance test is triggered for nitrogen oxides after accumulating 968 hours based on a 12-month rolling total. A test for carbon monoxide is done at the same time.

The applicable State SIP has been streamlined with the current SIP, and is provided in the attached document.

Reporting of permit deviations and excess emissions, located in Attachment "A", Section XII.A and B, have separate requirements, as based on the local rules. Excess emissions is defined in A.A.C. R18-2-101.37 as follows:

"Excess Emissions" means emissions of an air pollutant in excess of an emission

standard as measured by the compliance test method applicable to such emission standard.

Meaning, that excess emissions are determined only through performance testing. Permit deviations include excess emissions, but are not limited to them. The permit deviation section language has been taken from 40 CFR 71.6.

VII. PERIODIC MONITORING

A. Combustion Turbine and Startup Diesel Engines

Opacity: The units are subject to the opacity standard of $\leq 40\%$ under A.A.C. R18-2-719.E. The units currently burn fuel oil no. 2 only, but has requested the option to also burn natural gas in the turbine. Permittee is required to monitor and record opacity according to the following schedule, and only when fuel oil is burned:

- (1) When fuel oil is burned continuously for a time period > 72 hours but less than 168 hours (1 week), then one EPA Method 9 reading is required.
- (2) When fuel oil is burned continuously for a time period > 168 hours, then for each 168 hour period one EPA Method 9 reading is required.

The Permittee is also required to monitor and record the number of hours fuel oil is burned continuously in the units. The triggering time period of 72 hours was established through meetings with the stakeholders. This time period is of particular importance to the stations where there may not be a certified opacity observer to conduct observations during weekends, holidays, etc.

Particulate matter: The units are also subject to the particulate matter emissions standard under A.A.C. R18-2-719.C.1. Using the operating parameters provided in Table 3 with the maximum generating capacity, the limit under A.A.C. R18-2-719.C.1 imposes an allowable limit of 355 tons per year of PM on the combustion turbine. From Table 4, the PM potential to emit is 79.13 tons per year, which is 22% of the allowable.

The permittee is required to monitor the following information about the fuel found in the contractual agreement with the liquid fuel vendor:

1. Heating value;
2. Ash content.

Although ash content by itself is not a valid measure of particulate matter emissions, monitoring this would help the agency to determine a "ballpark" estimate of the particulate matter emissions. No engineering estimation using ash content is prescribed in the permit since it could be interpreted to incorrectly correlate particulate emissions and ash content. The permittee is required to keep on record a copy of the contractual agreement.

Sulfur dioxide: The units are subject to the sulfur dioxide standard under A.A.C. R18-2-719.F. The emission standard in A.A.C. R18-2-719.F imposes a limit of 1297 tons of sulfur dioxide per year. From Table 4, the potential to emit is 655 tons per year of sulfur dioxide for the turbine. A.A.C. R18-2-719.J requires reporting of all periods when the sulfur content of the fuel exceeds 0.8 percent by weight. This differs from the 0.9 percent by weight requirement from the definition of low sulfur fuel in R18-2-701.16. The two limits are addressed separately - the 0.8 percent by weight is a reporting requirement and the 0.9 percent by weight is a limitation on the sulfur content of the fuel. Permittee is required to keep on record fuel oil supplier certification including the following information:

1. The name of the oil supplier;
2. The sulfur content and the heating value of the fuel from which the shipment came from; and
3. The method used to determine the sulfur content of the oil.

Permittee is required to make engineering calculations for SO_x emissions for each fuel delivery using the above information and the following equation,

$$\text{SO}_2(\text{lb/MMBtu}) = 2.0 \times [(\text{Weight percent of sulfur}/100) \times \text{Density}(\text{lb/gal})] / [(\text{Heating value}(\text{Btu/gal})) \times (1 \text{ MMBtu}/1,000,000 \text{ Btu})]$$

Dates and Hours: The Permittee is required to monitor and record the dates and hours during which the units are in operation. The recorded operating hours will be used by the Permittee in determining if any stack opacity readings need to be taken. The hours of operation will also be used to determine the need for performance testing on the turbine.

The Permittee is also required to report the dates and hours of operation semi-annually, during the six months prior to the date of the report.

B. Non-point sources

The standards in Article 6 are applicable requirements for non-point sources. The following sources will be monitored:

1. Driveways, parking areas and vacant lots
2. Unused open areas
3. Open areas (Used, altered, repaired, etc.)
4. Construction of roadways
5. Material transportation
6. Material handling
7. Storage piles
8. Stacking and reclaiming machinery at storage piles

All of these areas must comply with the opacity limitation of 40%. The control measures for these sites include gravel for driveways (1) and native vegetation for unused open areas (2). Most of the other sources require control measures of dust suppressants and/or wetting agents (3-8). Material transportation and storage piles also include covering the material (5 and 7), while stacking and reclaiming includes minimizing fall distance (8).

Monitoring and record keeping requirements for the unpaved roads, parking areas and vacant lots includes keeping a log of dates paving, vegetating or chemically stabilizing activities are performed. Unused open areas (1) includes a monthly status of the areas and dates fresh vegetation was added. All other non-point sources (2-7) require a record of the date and type of activity performed, and the type of controls used. Also, monitoring requirements for the applicable open burning rule may be satisfied by keeping all open burn permits on file.

The facility is unmanned, so the current controls are minimal. The entrance road is covered with gravel and the open areas are hard packed dirt. The source is planning to put up a speed limit sign on the entrance road to reduce particulate emissions from vehicular traffic.

APS has indicated in the application, that rare instances of open burning may occur. The condition in the permit directs APS to obtain a permit from ADEQ, or the local officer in charge of issuing burn permits.

C. Other Periodic Activities

Abrasive Sand Blasting

APS has indicated in the permit application that there might be a few occasions on which abrasive sand blasting activities are conducted on-site. R18-2-726 and R18-2-702 (B) are applicable requirements, and as such have to be included in the permit. Monitoring requirements for this activity are included in the permit.

Spray Painting

APS has indicated in the permit application that there might be a few occasions on which spray painting activities are conducted on-site. R18-2-727 and R18-2-702(B) are applicable requirements, and as such, have to be included in the permit. R18-2-727(A) and R18-2-727(B) are included in the approved State Implementation Plan (SIP). R18-2-727(C) and R18-2-727(D) are also a part of the approved SIP. They are present in the definitions section of the SIP as R9-3-101.117. EPA approved SIP provision R9-3-527.C is not present in the amended rule. However, R9-3-527.C is an applicable requirement, and is federally enforceable till the current State SIP is approved by the EPA. Monitoring requirements for this activity are included in the permit.

Asbestos Demolition/Renovation

As a means of demonstrating compliance with the requirements for asbestos demolition/renovation activities, the Permittee has been required to keep a record of all relevant paperwork on file. The relevant paperwork shall include but not be limited to the “NESHAP Notification for Renovation and Demolition Activities” form, and all supporting documents.

VIII. PERFORMANCE TESTS

The source shall be tested for each criteria pollutant which it emits in quantities above the major source threshold. Performance tests for NO_x and CO are triggered after the turbine logs more than 968 hours of operation based on a 12-month rolling total. The primary fuel of operation shall be used during the performance testing. Method 20 will be performed for NO_x and Method 10 for carbon monoxide.

The number of hours that trigger the performance test was determined from the major source threshold of 100 tpy.

$$\text{Hours of Operation} = 8760 \text{ (hrs/yr)} \times 100 \text{ (tpy)} / 905 \text{ (tpy - PTE for NO}_x\text{)} = 968 \text{ hours}$$

The source does not need to be tested for sulfur dioxide due to the development of the equation in Section VII.A of this document. This equation provides the exact amount of sulfur dioxide being emitted based on the sulfur content of the fuel.

IX. INSIGNIFICANT ACTIVITIES

The following activities have been deemed either insignificant or not.

Table 8: Insignificant Activities

Source No.	Insignificant Activities Sources	Pollutants	Insignificant	Governing rules
1	Accidental Fires	PM10, Combustion Products	Yes	
2	Acetylene, Butane, Propane Torches	Acetylene, Butane, Propane	Yes	below 112(r)
3	Activities Associated with Maintenance Repair or Dismantlement of an Emission Unit or other Equipment.	VOC's	Yes	
4	Aerosol Can Usage	VOC's and CFC's	No	112(r)
5	Brazing and Soldering Activities	PM10, Fumes	Yes	
6	Cathodic Protection	Ozone	Yes	
7	Caulking Operations	Solvents	Yes	
8	Chemical Storage Barrels	Solvent Vapors	No	112(r)
9	Chemical Storage, Hazardous Products and Staging Area,	Solvent Vapors	No	112(r)
10	Corona	Ozone	Yes	
11	Electric Motors	Ozone	Yes	
12	Emissions Sampling and Associated Activities	Combustion Products	Yes	
13	Evaporative Coolers	Water Vapor	Yes	
14	Facilities used for Preparing Food	Combustion Products	Yes	
15	Fire Fighting Activities	PM10, Combustion Products	Yes	
16	Flammable Storage Cabinets	Solvent Vapors	No	112(r)
17	Flares Used to Indicate Danger to the Public	PM10, Combustion Products	Yes	
18	Fuel Oil Piping Systems Including: Flanges, Valves, Pump Seals, Pressure Relief Valves and other Individual Components	Oil Vapor	Yes	

19	Fugitive Dust Emissions From the Operation of a Passenger Vehicles	PM10	No	A.A.C. R18-2-610
20	Combustion Turbine False Start Drains	VOC's	Yes	
21	Combustion Turbine Lube Oil Vents	Oil Vapor	Yes	
22	Combustion Turbine Starting Diesel Engine	Combustion Products	No	A.A.C. R18-2-719
23	Hydraulic System Reservoirs	Oil Vapor	Yes	
24	Janitorial Activities	Chemical Fumes	Yes	
25	Lube Oil Storage Area (New Product)	Oil Vapor	Yes	
26	Medical Activities	Alcohol,	Yes	
27	Normal Usage of Misc. Consumer Products	CFC's and VOC's	Yes	
28	Oil Circuit Breakers	Ozone, Oil Vapor	Yes	
29	Oil Filter Draining	Oil Vapor	Yes	
30	Paint Storage Area	Solvents	No	112(r)
31	Painting	Solvents	No	A.A.C. R18-2-727
32	Pesticide/Herbicide Activity	Pesticide/Herbicide	No	112(r)
33	Portable Testing Equipment and Testing Activities	VOC's	Yes	
34	Portable Welder	PM10, Combustion Products	Yes	
35	Production of Hot Water Not Related to Industrial Process	Combustion Products	Yes	
36	Pump/Motor Oil Reservoirs	Oil Vapor	Yes	
37	PVC/ABS Pipe Welding	Solvent	Yes	
38	Repair and Maintenance of Roads or other Paved or Open Areas	PM10	No	Douglas PM ₁₀ SIP
39	Safety Devices, Fire Extinguishers and Cardox Systems	PM10	Yes	

40	Satellite Accumulation Barrels	Solvent Vapor	Yes	
41	Service Water and Piping	Water Vapors	Yes	
42	Small Equipment Fueling Area	VOC's	Yes	
43	Smoking Areas	Tobacco Smoke	Yes	
44	Station Transformers	Oil Vapor	Yes	
45	Steam Cleaners	Water and VOC's	Yes	
47	Storage Tank , 20,000 bbls, Diesel Fuel Oil #2	Fuel Oil Vapor	Yes	
48	Storm Water Drainage Area	Water Vapor	Yes	
49	Used Oil Storage Area	Oil Vapor	Yes	
50	Welding	PM10	Yes	
51	Portable Toilet	Methane	Yes	